Industrial policy for growth

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Kristine Farla

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This working paper is part of the research programme on 'Institutions, Governance and Long-term Economic Growth', a partnership between the French Development Agency (AFD) and the Maastricht Graduate School of Governance (Maastricht University – UNU-Merit). The research builds on the Institutional Profiles Database IPD, jointly developed by AFD and the French Ministry of the Economy since 2001.

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AFD-MGSoG/UNU-Merit Working Paper Series on
« Institutions, Governance and Long term Growth »

In 2010, the French Development Agency (AFD) initiated a partnership with the Maastricht Graduate School of Governance (Maastricht University - UNU-Merit) with a view to exploring the conceptual and econometric relationships between institutions and long-term growth. As a development bank with a long-term lending horizon, AFD is particularly interested in better understanding the determinants of countries' long term economic, social, and political trajectory.

AFD has thus developed a programme on "Institutions, Governance, and Long-term Growth" dealing with the five following dimensions:

(i) Measuring institutions and discussing the meaning of such measures, notably through the Institutional Profiles Database;
(ii) Testing the econometric relationship between institutional measures and long term growth;
(iii) Exploring through a series of country case studies the historical relationship between processes of economic accumulation, forms of political organisation, and social cohesion;
(iv) Discussing conceptual frameworks for making sense of the interaction between political, social and economic forces in the process of development;
(v) Developing methodologies for political economy analyses.

The MGSoG/UNU-Merit team is involved in the five dimensions with a particular focus on the first two. Its primary objective is to explore the Institutional Profiles Database jointly developed by AFD and the French Ministry of the Economy since 2001. Institutional Profiles Database is unique by its scope (about 350 elementary questions pertaining to all institutional dimensions covering 148 countries in 2012), its entirely free access, and its ambition to incorporate the most recent theoretical advances in the field of political economy.

The present series intends to convey the results of our ongoing research, and in so doing to reflect the wealth of issues that can be fruitfully addressed from an "institutionalist" perspective. We hope that readers will find these papers stimulating and useful to develop their own understanding and research.

Nicolas Meisel (AFD)
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Industrial Policy for Growth*

Kristine Farla†

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Working Paper

Abstract

This study distinguishes between industrial policy that stimulates incumbent industry development, 'pro-business policy', and industrial policy that promotes the development of free markets, 'pro-market policy'. We find that there is a positive relation between the level of countries' implementation of these policies. However, we find opposite effects of pro-business and pro-market policies when estimating the policy effect on growth and income level. Pro-business policy has a positive effect on economic development, and pro-market policy has a negative effect on economic development.

Keywords: Industrial Policy, Growth
JEL Classification: L50, O11, O25, O43

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1 Introduction

Endogenous growth theory generally predicts that market liberalization, deregulation, openness, and competition are key to growth. Policies that favor given sectors or industries are generally criticized for inducing firms to lose competitive drive and lower investment. However, scholars find that the relation between industrial policy and industrial development is ambiguous. For example, Aghion, Bloom, Blundell, Griffith, and Howitt (2005) find that competition creates both incentives and disincentives for innovation. Acemoglu, Aghion, and Zilibotti (2006) show that low competition may have negative long-run effects and may prevent catch-up. Nevertheless, Acemoglu et al. (2006) also show that countries at early stages of development may benefit from anticompetitive policy that protects or supports incumbent industry development and, as a result, may experience faster growth and technological convergence. Following Khan (2008, p. 57), in Pakistan, "protection and subsidies proved to be extremely effective in driving investment in sectors that had previously been neglected", and "import substitution, as a method of developing new capabilities, was initially extremely successful in both India and Pakistan." To what extent is industrial policy aimed at supporting existing industry competitiveness? Is such policy important for growth? This study is an analysis of countries' industrial policy package and the relation between industrial policy and growth.

Rodrik and Subramanian (2005) find that in India high levels of growth in the 1980's were triggered by 'pro-business' rather than 'pro-market' policy.[1] The authors define pro-business policies as policies that support the development of existing industry and are "aimed primarily at benefiting incumbents in the formal industrial commercial sector" (Rodrik and Subramanian, 2005, p. 215).[2] Furthermore, the authors define pro-market polices as policies that are aimed at stimulating competition and benefit new entrants and consumers.

Khan and Blankenburg (2009) distinguish industrial policy using two policy groups: strong and targeted policy and weak and horizontal policy. The first group comprises policies that target firms or sectors to enable these to become competitive. The second group comprises policies that sustain productivity in competitive markets and thereby discourage permanent rent-

[1] Rodrik and Subramanian (2005) study the variation in political alliances between state governments and the Indian national government and interpret this as a proxy for an attitudinal shift toward pro-business policy.

[2] Pro-business policy is closely related to the infant industry protection argument: protect weak industries throughout initial capacity development stages so that, in the future, the industries can operate in a competitive market.

seeking behaviour. This distinction of policy is similar to the work of Rodrik and Subramanian (2005). The description of the first group of policies is alike to that of pro-business type policies, and the description of the second group is alike to that of pro-market type policies.

Building on the argument of Khan and Blankenburg (2009), a possible scenario is that countries' policy emphasis shifts from pro-business to pro-market policy as industrial development 'catches up'. Following Khan and Blankenburg (2009), the first stage of industrial development requires pro-business type policies that protect the incumbent industries' knowledge acquisition. The second phase of industry development requires pro-market type policies that increase market competition with the aim to spread innovation and technology and set-off a Schumpeterian process of creative destruction (Khan and Blankenburg, 2009). In fact, scholars argue that competition policy is only enforced gradually (Possas and Borges, 2009). Pro-business policy may also function as a short-run solution to market failure in countries with a relatively weak institutional setting. And countries with formalized property rights and contracting institutions may require relatively less pro-business policy.

If industrial development is steered by the sequential implementation of pro-business and pro-market policy, there is a trade-off between these policies. An example of a trade-off between pro-market and pro-business policy is the following: export subsidies are implemented with the aim to support the domestic industry to become competitive with the foreign market. However, WTO agreements prohibit the use of export subsidies. Rodrik and Subramanian (2005) describe pro-market and pro-business policy as opposing policy packages.

This study is motivated by the theoretical advancements of North, Wallis, and Weingast (2009) who argue that elite distribute rents in order to maintain political stability and hence, elite prosperity. Both pro-market and pro-business policy are sources of rent distribution. For example, market liberalization and privatization have re-distributed large rents to elite under the pretext of market development (Schamis, 2002). Also, an absence of anti-competition policy can be explained by pressures from economic elite interested in securing industry dominance (Acemoglu et al., 2006). Pro-business policy reform has been used to gain political support from the private sector (Rodrik and Subramanian, 2005).

We investigate the extent to which there is a trade-off between pro-business and pro-market policy and analyze the relationship between countries' industrial development path and economic performance. In this study, we differentiate between pro-market and pro-business type policies on the basis of a cross-country analysis. We relax the assumptions of pro-market

and pro-business policy as described by Rodrik and Subramanian (2005) and analyze policy data with an open mind. On the basis of qualitative policy data, we find that it is possible to distinguish between pro-market and pro-business type policies, and we construct a measurement for each policy type. The two policy measures are positively correlated across countries and over time. Based upon this observation, it appears that pro-market and pro-business policies form a compatible policy package. We run fixed effects regressions using data from 1995-2009 and 56 countries to test the effect of pro-market and pro-business policy on growth and income. Whilst pro-business policy is positively related to growth and income, pro-market policy has a negative impact on economic performance.

2 Empirical Approach

2.1 Industrial Policy Indicators

Industrial policy covers a broad range of policies. For example, Di Maio (2009) describes industrial policy as including the following policies: innovation and technology, education and skills formation, trade, targeted industry support measures, competitiveness, and competition regulation. We are interested in policy data that covers a broad range of industrial policy aspects.

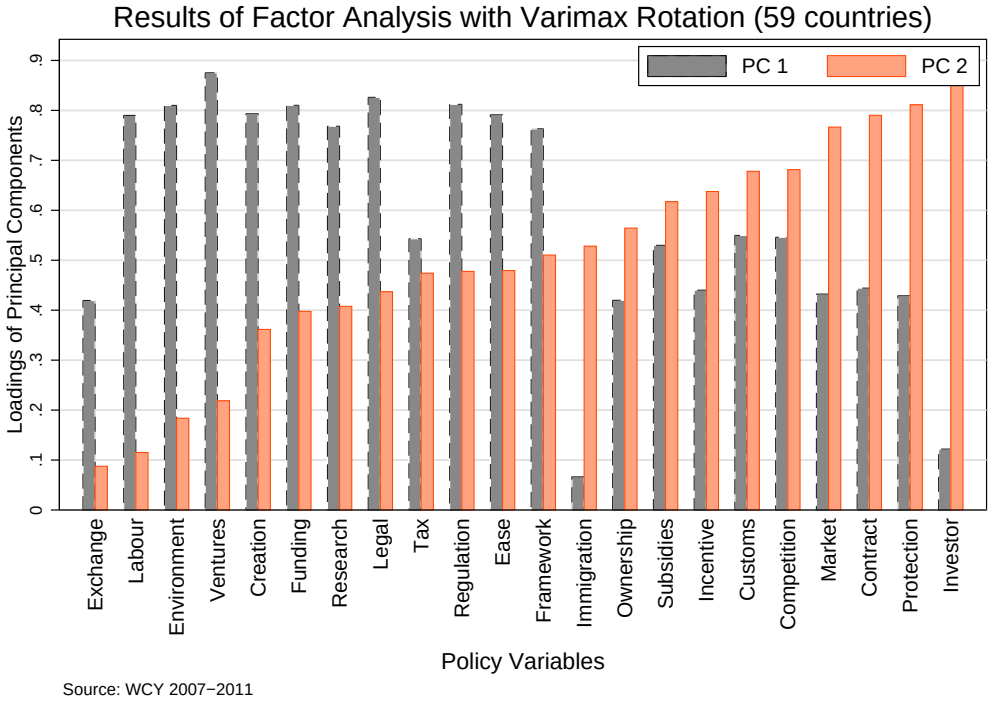
We use survey data from the IMD World Competitiveness Yearbook (IMD), hereafter referred to as WCY, because the data has a broad range of variables that describe policy that targets the private sector. This selection of policy variables is listed in Table 8 in the appendix.[3] The WCY survey data covers 59 countries and includes data for the years 1995-2011. The countries included in the WCY dataset are listed in Table 7 in the appendix.

We analyze the selection of WCY policy data with the intention to identify a pattern for the pro-business and / or pro-market policy variables. This analysis is done on the basis of principal component analysis (PCA). A PCA is run on the WCY policy indicators for the years 2007-2011, and two principal components (PCs) are retained. We retain two PCs because we are interested in identifying two policy domains. We retain this selection of years because prior years contain more missing observations. For the years

[3]The WCY survey data is collected with the intention to describe the degree of competitiveness of countries. The WCY survey is sent to executives working in a range of sectors. The sample size of each country is proportional to the countries' GDP. Data is collected during the period January to April. In 2011, the WCY collected 4,935 surveys (IMD, 2011). Survey respondents are asked to make a country assessment on the basis of a scale of 1 to 6. The WCY presents the average country score per variable on a scale of 0 to 10, where 10 is associated with high competitiveness.

2007-2011, the following countries have missing observations for one or more years: United Arab Emirates for 2007-2010, Peru for 2007, Iceland for 2009, Kazakhstan for 2007, and Qatar for 2007-2008.[4] In order to facilitate the interpretation of the PCs, the PCs are rotated using varimax rotation which computes orthogonal factors. The first PC contains 40% of the total variation, and the second PC contains 30% of the total variation. The loadings of the PCA are presented in Figure 1.

Figure 1: Analysis of Policy Indicators



PC 1 loads high on the variables Labour, Environment, Ventures, Creation, Funding, Research, Legal, Tax, Ease, and Regulation. This PC also loads relatively high on the variables Framework and Exchange in comparison to the loadings of PC 2. PC 1 loads high on policy variables that support technological advancement and knowledge accumulation. PC 1 loads strongly on variables that describe the ease of access to funds to finance research and technological development. PC 1 also loads strongly on variables that support the existing industry competitiveness and development. These policies

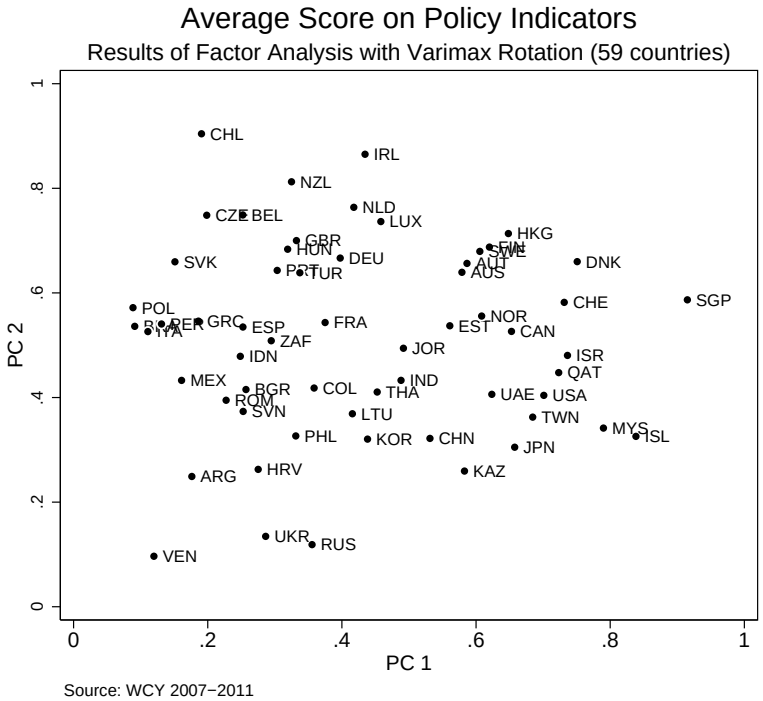
[4]The total number of observations used in the PCA is 286.

support industry that otherwise may be under-invested. PC 1 is a proxy for the following concepts: pro-business policy (Rodrik and Subramanian, 2005) and strong and targeted policy (Khan and Blankenburg, 2009).

PC 2 loads high on the variables Subsidies, Competition, Customs, Market, Investor, Contract, and Protection. Moreover, the loadings of the variables Ownership, Incentive and Immigration are relatively higher for PC 2 than for PC 1. PC 2 summarizes a group of variables that describe market liberalization, competition policy and deregulation. PC 2 describes regulations that are aimed at stimulating a free market economy. PC 2 is a proxy for the following concepts: pro-market policy (Rodrik and Subramanian, 2005) and weak and horizontal policy (Khan and Blankenburg, 2009).

Figure 2 presents a scatter plot of PC 1 and PC 2.[5] The scatter plot gives a first indication of the extent to which a country scores relatively higher on pro-business policy rather than on pro-market policy. For example, Malaysia, Iceland, and Singapore score relatively higher on PC 1. Chile, New Zealand, and Ireland score relatively higher on PC 2.

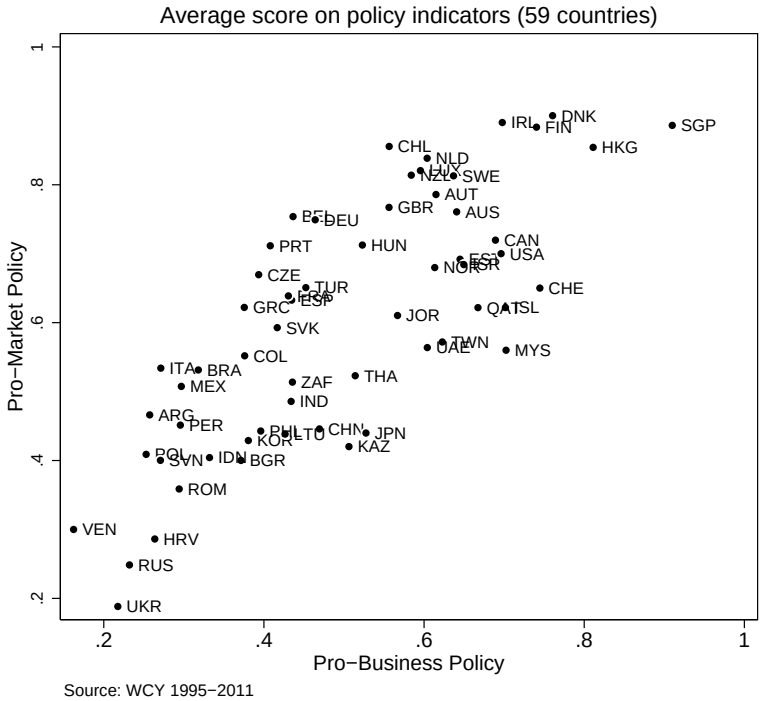
Figure 2: Analysis of Policy Indicators



[5]The PCs are normalized on a scale of 0 to 1.

The orthogonality of these indicators inhibits their comparability with alternative indicators and does not allow for the study of countries' 'natural' scores. Moreover, we are interested in studying the policy data for the years 1995-2011. Therefore, the results from the PCA with varimax rotation are merely used to separate the policy dataset into two policy domains: pro-market and pro-business. Next, we calculate the average score of the pro-market policy variables and of the pro-business policy variables for each country and year; missing values are ignored. Finally, the indicators are normalized on a scale of 0 to 1, where 1 is associated with more implementation of pro-market and pro-business policy. Hereafter, these indicators are referred to as pro-market and pro-business. The average scores over time of the resulting policy indicators are illustrated in Figure 3. Whereas Figure 2 shows the relation between orthogonal policy indicators, Figure 3 shows the relation between non-orthogonal policy indicators.

Figure 3: Analysis of Policy Indicators



Following Figure 3, pro-market and pro-business policy appear to be positively correlated. We find no evidence that, on average, countries that are in a catch-up stage implement relatively more pro-business policies. Instead,

Figure 3 suggests that pro-market and pro-business policies are complementary. We expect that countries that score in the upper-right corner of Figure 3 have relatively more policy space.[6] Furthermore, the close correlation between the policy indicators suggests that countries maximize both policy domains in accordance to countries' stage of catch-up.

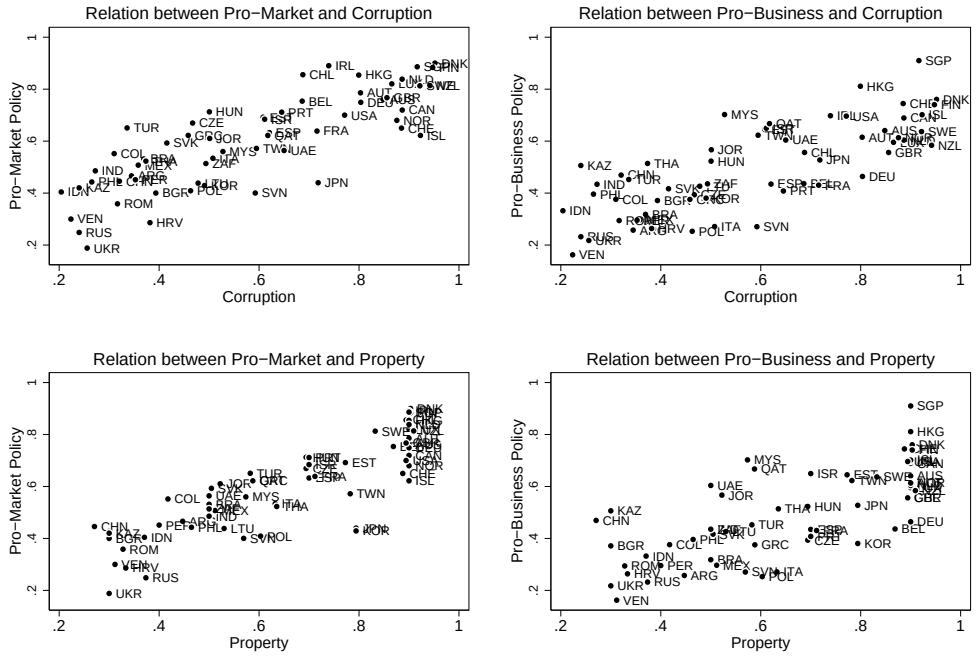
Figure 4 presents the results of a rough assessment of the relation between policy and countries' institutional development. Measures of property rights protection and corruption are used as proxy for countries' institutional development.[7] The indicator for property rights has a scale of 0-1, where higher scores are associated with a high degree of property rights protection. The indicator for corruption also has a scale of 0-1, where higher scores are associated with freedom from corruption.

The scatter plots in Figure 4 show similar relationships between the policy indicators and the institutional indicators. We find that pro-market and pro-business policy has a positive and overall linear relation with property rights protection and corruption. As such, countries with a formalized institutional setting are expected to implement relatively more industrial policy. We find no evidence that states implement pro-business policy to overcome market failure in countries with relatively weak institutions. On the contrary, The scatter plots in Figure 4 suggest that countries' institutional setting plays an important role in defining a countries' policy space and hence, the implementation of a given policy package.

[6]Countries policy space represents the choice spectrum a country has in deciding upon effective policy instruments.

[7]Data on property rights and corruption is from the Heritage Foundation. For the data sample of the WCY policy data, the average scores of the property rights and corruption data are calculated for each year. However, the property rights and corruption indicator have missing observations for Iceland for the years 1995-1996. And the following countries have missing observations for the year 1995: Norway, the Netherlands, Belgium, Switzerland, New Zealand, Luxembourg, Finland, and Denmark. The property rights and corruption indicators are normalized on a scale of 0 to 1.

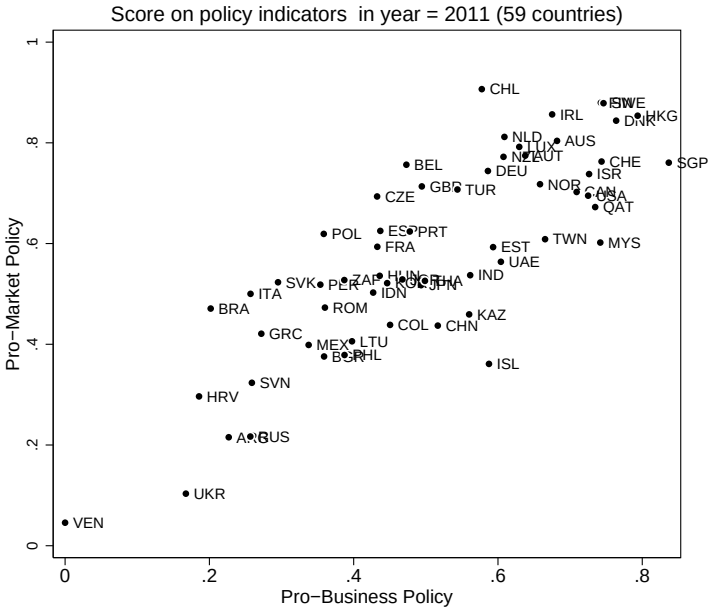
Figure 4: Institutions and Policy



Source: WCY 1995−2011 and Heritage Foundation 1995−2011

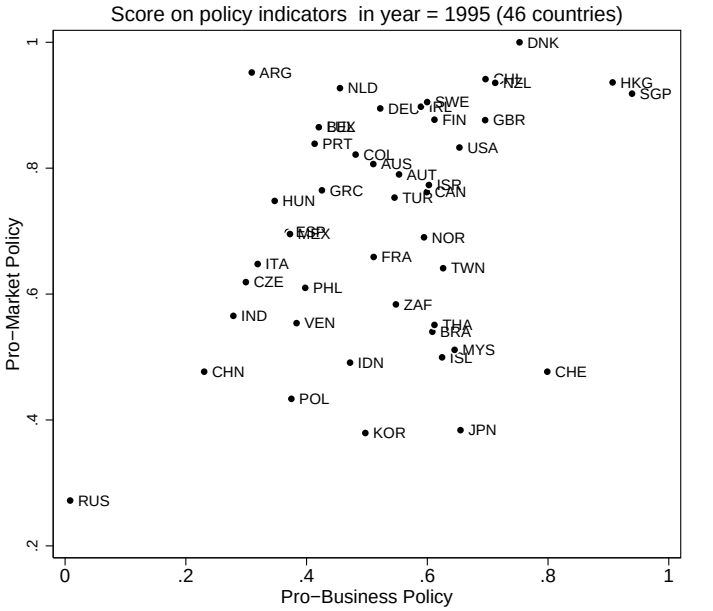
Figure 5 illustrates countries' scores on the policy indicators in 2011. Likewise, as in Figure 3, pro-market and pro-business policy have a strong linear relation. Correlation between these indicators in this year is 0.82. Figure 6 illustrates the association between pro-market and pro-business policy for the year 1995. The correlation between the pro-market and pro-business indicators in year 1995 is 0.38. Figure 6 illustrates that in 1995 the countries in the lower-right corner, e.g. Japan, Malaysia, Korea, Switzerland, and Brazil, had a stronger emphasis on pro-business policy than on pro-market policy. However, in 2011, (Figure 5) this observation is no longer valid. In 1995, few countries scored high on the pro-business indicator. The overall dispersion of countries on the pro-business policy indicator is lower in Figure 6 than in Figure 5.

Figure 5: Analysis of Policy Indicators



Source: WCY 2011

Figure 6: Analysis of Policy Indicators



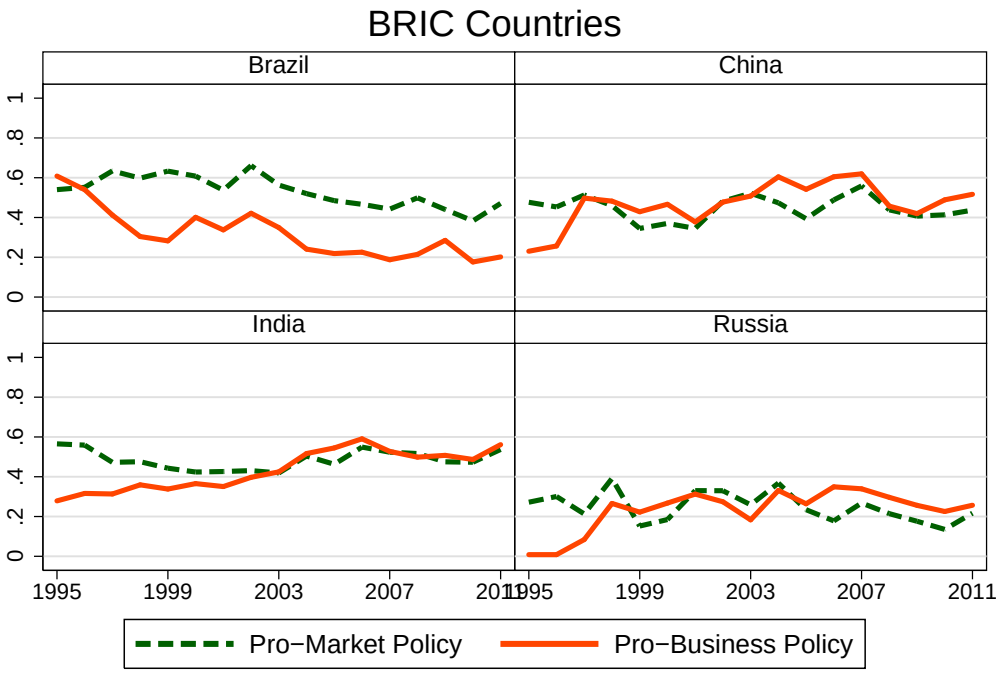
Source: WCY 1995

2.2 Variation in Industrial Policy Development

This section presents the scores on the pro-market and pro-business indicators over the years 1995-2011 for a selection of countries. Figure 7 displays the scores for the countries Brazil, Russia, India, and China and, Figure 8 displays the scores for the countries South Korea, Singapore, Honk Kong and Taiwan. We present the scores for the 'BRIC' countries because these countries can be perceived to be at similar stages of economic development. Moreover, we present the scores for the 'Asian Tigers' because this group of countries experienced high growth rates since the 1960s.

Based upon this selection of countries, it appears that the policy indicators move closely together over time. One exception is the converging trend we observe for India, Russia and China during the 1995-1998. Furthermore, the policy indicators are relatively stable, and during the period 1995-2011 the countries generally move within a 20% bandwidth. Policy changes appear to be representative of countries' de-facto policy environment and appear less related to changes in e.g. competition law.

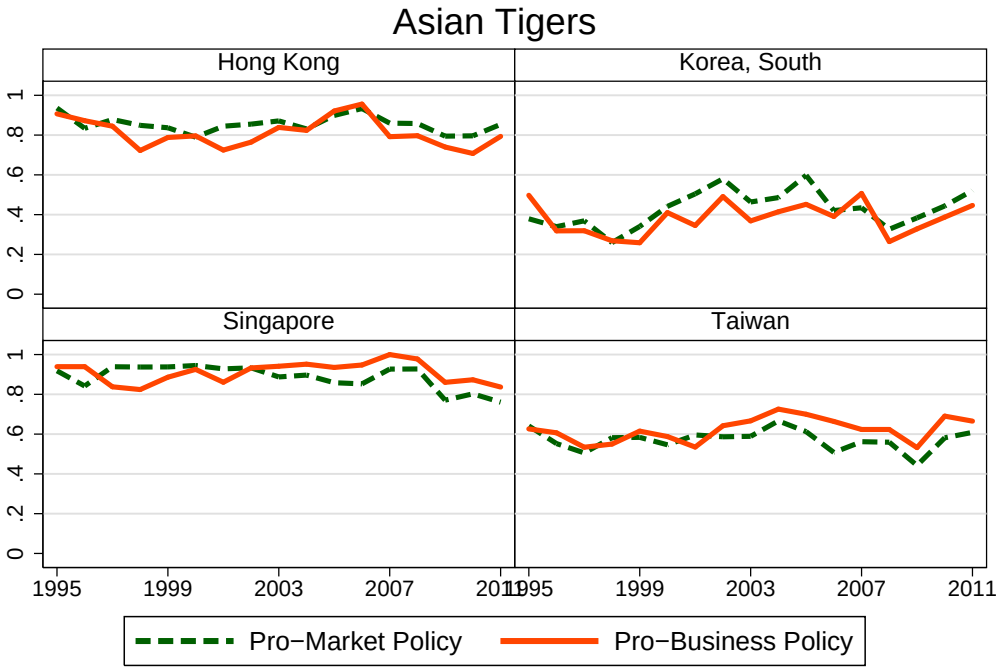
Figure 7: Policy Indicators over Time



Source: WCY 1995−2011

Amongst the BRIC countries, the country that scores lowest on both pro-business and pro-market policy is Russia. India has an increasing trend in pro-business policy for the years 1995-2006. On average, Brazil's score on the policy indicators follows a decreasing trend. In particular, since 1996, Brazil scores relatively higher on pro-market than on pro-business policy. Hong Kong and Singapore have a stable score on both pro-market and pro-business policy and score relatively higher on the policy indicators than the BRIC countries.

Figure 8: Policy Indicators over Time



Source: WCY 1995−2011

2.3 Validity of Policy Indicators

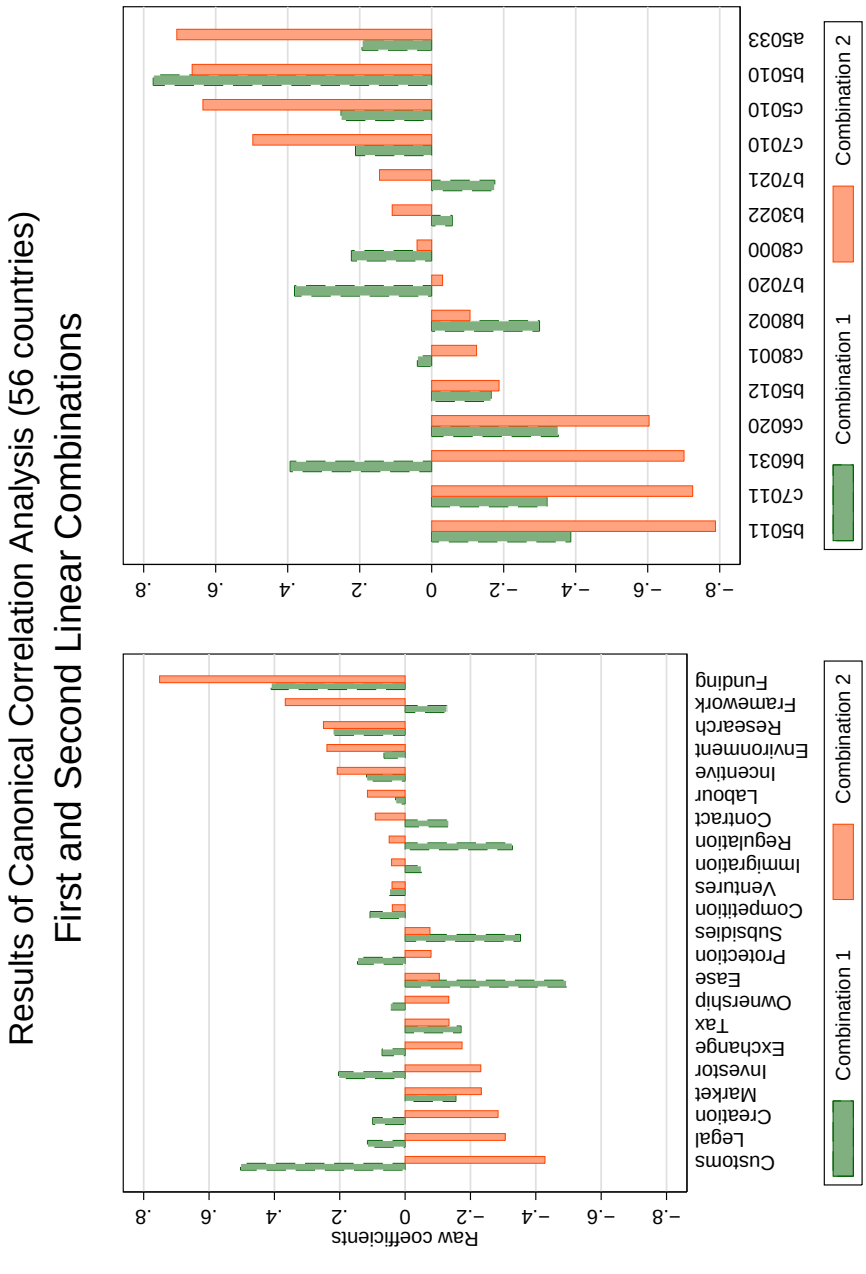
The two policy domains constructed on the basis of data from WCY are compared with alternative policy indicators. We select variables from the Institutional Profiles Database (IPD) 2009 that are conceptually close to the variable selection of the WCY dataset. The policy indicators from the IPD are listed in Table 9 in the appendix. Based on the policy domains constructed for the WCY dataset, the IPD variable selection is sorted in order to describe either pro-business or pro-market policy.

We use Canonical Correlation Analysis (CCA) to compare the variable selection from the WCY with the variable selection from IPD. We assume that countries' score on pro-market and pro-business policy is relatively constant over time and therefore use the IPD data from 2009 and WCY data from the years 2007-2011. The CCA is based on 272 sample observations and 56 countries. Unlike the sample used for the PCA in section 2.1, the countries Croatia, Iceland, and Luxembourg are excluded in the CCA due to missing observations in the IPD 2009 dataset. The results of the CCA are presented in Figures 9 and 10. We focus on the first and second linear combination. The Pearson canonical correlations of the first and second linear combination are 0.9 and 0.85.[8]

The raw coefficients of the first two linear combination of the CCA are presented in Figure 9. The raw coefficients are interpreted as the effect of a one unit increase in a variable on the corresponding canonical variate. We cannot identify a pattern across the pro-market and/or pro-business policy variables based on the first linear combination and the raw coefficients. The second linear combination does identify some pro-business variables from the WCY dataset that are positively associated with pro-business variables from the IPD dataset. The pro-business variable that describes the availability of funding for technological development (Funding) has a very high positive loading compared to the other variables in the WCY data. Also, in descending order, Framework, Research, and Environment have a positive loading and have previously been identified as pro-business variables. The three variables that have the highest positive loading amongst the IPD variables are classified under pro-business policy. These three variables describe government support for research and development (A5033), institutions that support research and technological acquisitions for SMEs (B5010), and government venture capital initiatives (C5010). The variables that have high negative loadings include both pro-business and pro-market variables.

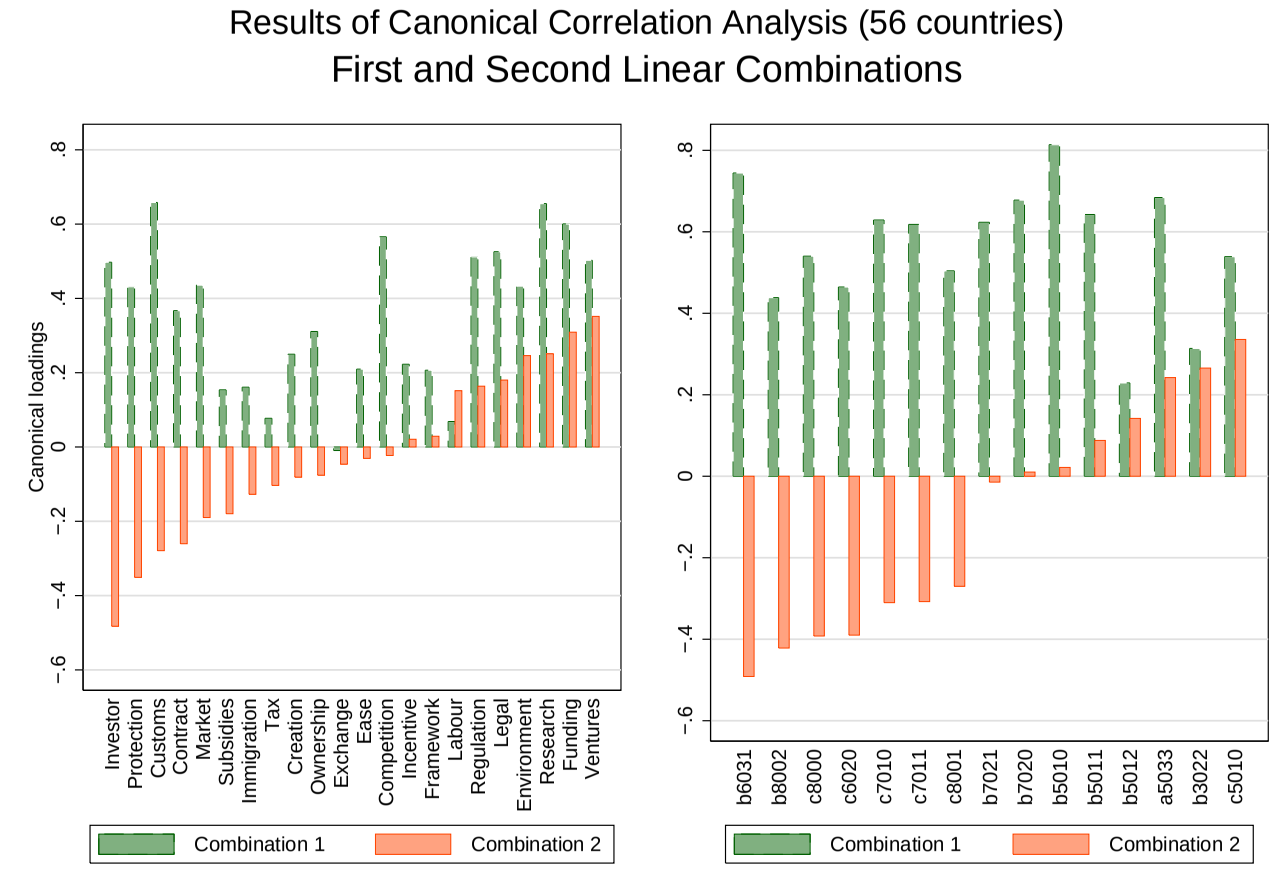
[8]The Wilks lambda, Pillai's trace, Lawley-Hotelling trace, and Roy's largest root tests are all significant at a 1% level.

Figure 9: Raw Coefficients



Source: WCY 2007–2011 and IPD 2009

Figure 10: Canonical Loadings



Source: WCY 2007−2011 and IPD 2009

The loadings resulting from the CCA are presented in Figure 10. Following Rencher (1992), the canonical loadings represent the correlation of the variables with their corresponding linear combination (canonical variate). The canonical loadings include less information than the raw coefficients do. However, the canonical loadings are useful to assist in the interpretation of results. The loadings of the first linear combination are high for most of the variables in both datasets. Some of the WCY variables have a relatively low loading (e.g Tax). These variables also have conceptually less relation with the IPD variables. The second linear combination distinguishes two groups of variables in both datasets. Most of the variables that have negative loadings have previously been identified as pro-market variables. And most of the variables that have positive loadings are associated with pro-business policy.

Based on the raw coefficients, the canonical loadings, and the canonical correlations we find that (1) the WCY and IPD policy variables have similar variation (2), and for both datasets, the pro-market and pro-business policy variables can be distinguished.

Finally, we compute averages for the selection of pro-market variables and for the selection of pro-business policy variables from the IPD dataset. Table 1 presents the Pearson correlations for the WCY and IPD pro-market and pro-business indicators. The indicators are all positively correlated. The correlation amongst the WCY data is the highest. The correlation between the policy indicators constructed from the IPD data is 0.53. The pro-business indicator from WCY has a higher correlation with the IPD pro-business indicator than with the IPD pro-market indicator. Also, the WCY pro-market indicator has a higher correlation with the IPD pro-market indicator than with the IPD pro-business indicator.

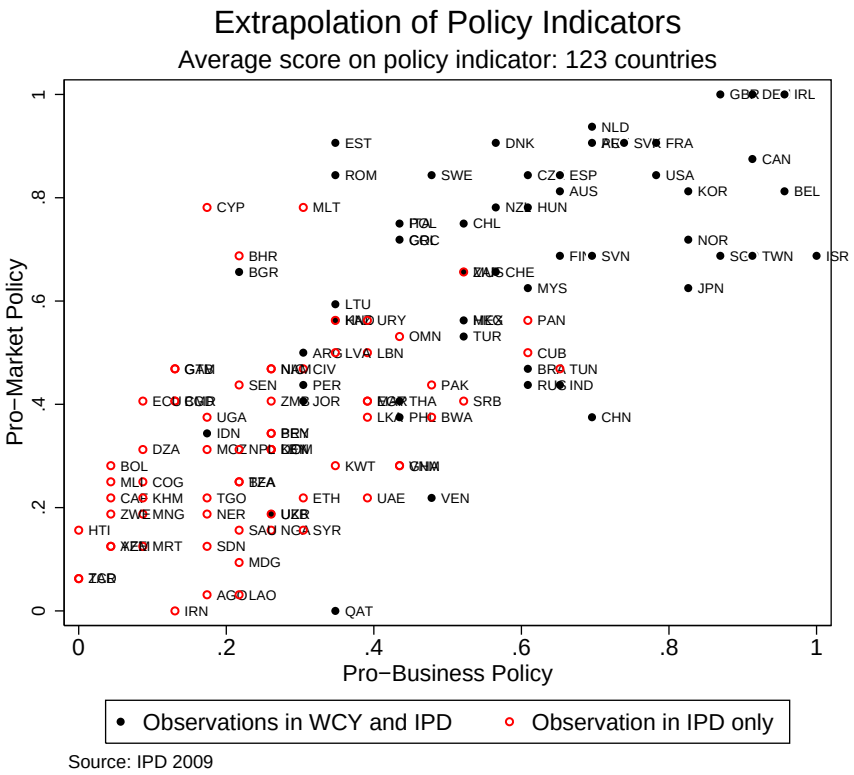
Table 1: Correlations between Policy Indicators (WCY 2007-2011 & IPD 2009)

		WCY		IPD	
		Pro-Market	Pro-Business	Pro-Market	Pro-Business
WCY	Pro-Market	1			
	Pro-Business	0.82	1		
IPD	Pro-Market	0.56	0.31	1	
	Pro-Business	0.44	0.41	0.53	1

2.4 Extrapolation of Policy Indicators

We are interested in mapping countries' industrial development path ranging from countries with low income and a fragile institutional setting to countries with high income and a strong institutional setting. We construct average pro-market and pro-business indicators for the 123 countries in the IPD 2009 data using the selection of policy indicators from IPD as discussed in section 2.3. The IPD data contains more less developed countries than the WCY dataset.

Figure 11: Analysis of Policy Indicators



The scores of the 123 countries on the pro-market and pro-business indicators are illustrated in Figure 11. As indicated by the legend in the figure, the countries that we document using the WCY dataset are given a different label than the countries for which WCY has no data. Overall, the former group of countries score higher on the policy indicators than the latter group does. There is a linear relationship between the two policy indicators. This

result confirms that countries that have a relatively low income level and weak institutional setting have implemented less industrial policy. For example, Peres (2009, p. 192) similarly concludes that "small countries with less institutional capacity not only should not develop policies of sectoral scope, but in fact cannot do so".

3 Industrial Policy and Growth

3.1 Descriptive Statistics

The main objective of industrial policy is to address market failures, to stimulate the development of a competitive industry and to stimulate growth. As such, the general expectation is that both pro-market and pro-business policy have a positive impact on economic performance. We study the relationship between the policy indicators and growth and income level using a fixed effects model.

The measures used for pro-market and pro-business policy are the average scores of the pro-market and pro-business variables from the WCY data for each country and year. For both the growth and the income model we control for the effect of government consumption, trade openness, level of secondary school enrollment, and investment. For the growth model we also control for the level of income in each preceding year. We take the natural logarithm of GDP when using GDP as the dependent and as the explanatory variable. The definitions and sources of the control variables are given in Table 10 in the appendix. The estimations are based on an unbalanced dataset for the years 1995 till 2009. The analysis is based on 56 countries that are listed in Table 7 in the appendix. Singapore, Taiwan, and the United Arab Emirates are not included in the analysis because of missing data for the control variable school enrollment.

Table 2: Summary Statistics

	MEAN	SD	MIN	MAX	N
Pro-market	0.64	0.19	0.02	1	640
Pro-business	0.5	0.18	0.07	0.96	640
GDP	9.78	0.82	7.36	11.98	640
Growth	2.57	3.76	-13.92	20.41	640
Investment	24.37	5.94	10.4	50.74	640
Openness	85.51	58.53	18.2	392.65	640
Gconsumption	8.67	3	2.58	18.91	640
Education	97.19	20.39	44.23	161.78	640

The summary statistics are presented in Table 2. On average, countries score higher on pro-market than on pro-business policy. The correlations between the dependent and the explanatory variables are presented in Table 3. For this sample, the pro-market and pro-business indicators are correlated 0.71. The policy indicators have a low correlation with growth and a positive correlation with income level.

Table 3: Pairwise Cross-Correlations

	Pro-market	Pro-business	GDP	Growth	Investment	Openness	Gconsumption	Education
Pro-market	1							
Pro-business	0.71	1						
GDP	0.53	0.48	1					
Growth	-0.04	0.03	-0.1	1				
Investment	-0.12	0.13	-0.09	0.3	1			
Openness	0.26	0.32	0.21	0.07	0.17	1		
Gconsumption	0.16	0.08	0.11	0.1	-0.01	-0.16	1	
Education	0.48	0.33	0.69	-0.09	-0.19	-0.05	0.25	1

3.2 Main Results

In this section, we present the results of a fixed effects model testing the effect of pro-market and pro-business policy on growth and on income. Table 4 reports the results for growth regressions, and Table 5 reports the results

for the income regressions. For both tables the preferred model is displayed in column two.[9]

Following Table 4 column 2, the policy indicators and the control variables have a significant effect on growth. The estimated effect of a one standard deviation increase in pro-business policy leads to a 0.27 standard deviation increase in growth. However, the estimated effect of a one standard deviation increase in pro-market policy corresponds to a 0.28 standard deviation decrease in growth.

Table 4 column 3 and 4 presents the results of separate estimations of the effect of the policy indicators on growth. We find that, when not taking into account the effect of pro-business policy, the negative estimated effect of pro-market policy almost halves. When not controlling for the effect of pro-market policy the effect of pro-business policy turns insignificant and the coefficient is lower. A possible explanation, for the difference between the results reported in column 2 and 4, is that pro-market policy has an important mediating effect on the relation between pro-business policy and growth. Controlling for the effect of pro-market policy may distinguish high income countries with a competitive industry that benefit from pro-business policy from high income countries that do not have a competitive industry and, as a result, do not benefit from pro-business policy.

Table 5 column 2 reports a significant relation between the explanatory variables and income level. The model estimates that a one standard deviation increase in pro-business policy corresponds to a 0.04 standard deviation increase in income. Moreover, the estimated effect of a one standard deviation increase in pro-market policy corresponds to a 0.08 standard deviation decrease in income. Openness has a high positive effect on income level. This suggests that countries that have a high level of trade are generally high income countries. Nevertheless, the effect of pro-market policy is negatively related to income level.

Similar to the results documented for the growth model, columns 3 and 4 in Table 5 report that not controlling for the effect of pro-business policy on income underestimates the impact of pro-market policy and that not controlling for the effect of pro-market policy may cause researchers to wrongly conclude that pro-business policy is not significantly related to income. The policy indicators have opposite partial effects. The correlation between the policy indicators' coefficients are negative 0.53 for the growth model and

[9]On the basis of the parameters used in Table 4 column 2, a Hausman test of the difference between fixed effects (FE) and random effects (RE) yields a χ^2 value of 232.15 which is significant and thereby supports estimating using a FE model. A Hausman test of the difference between FE and RE for the income model fails to meet the asymptotic assumptions of the Hausman test.

negative 0.52 for the the income model.

Table 4: Regression Results: Dependent Variable Growth

	(1)	(2)	(3)	(4)
Pro-market	-0.065	-0.277**	-0.146+	
	(0.52)	(0.00)	(0.05)	
Pro-business	0.398***	0.266**		0.110
	(0.00)	(0.01)		(0.18)
Investment		0.651***	0.692***	0.649***
		(0.00)	(0.00)	(0.00)
Openness		1.597***	1.641***	1.568***
		(0.00)	(0.00)	(0.00)
Gconsumption		-0.825***	-0.863***	-0.835***
		(0.00)	(0.00)	(0.00)
Education		0.520***	0.525***	0.535***
		(0.00)	(0.00)	(0.00)
GDP		-3.763***	-3.677***	-3.550***
		(0.00)	(0.00)	(0.00)
N	640	640	640	640
R^2	0.027	0.338	0.329	0.326

Standardized beta coefficients; p-values in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Regression Results: Dependent Variable Income

	(1)	(2)	(3)	(4)
Pro-market	-0.138***	-0.078***	-0.058***	
	(0.00)	(0.00)	(0.00)	
Pro-business	0.155***	0.044***		-0.001
	(0.00)	(0.00)		(0.95)
Investment		0.068***	0.075***	0.070***
		(0.00)	(0.00)	(0.00)
Openness		0.422***	0.436***	0.441***
		(0.00)	(0.00)	(0.00)
Gconsumption		-0.102***	-0.109***	-0.110***
		(0.00)	(0.00)	(0.00)
Education		0.073***	0.075***	0.082***
		(0.00)	(0.00)	(0.00)
N	640	640	640	640
R^2	0.143	0.622	0.614	0.591

Standardized beta coefficients; p-values in parentheses

$+\ p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The aggregated indicators are a cautious measure of the pro-market and pro-business policy concepts. Moreover, the correlation between the policy indicators is higher than the average correlation amongst the underlying variables. In the remainder of this section, we explore the extent to which the policy indicators' relationship with growth and income are representative of the relationship between the policy indicators' underlying variables and economic performance.

Two variables are selected to represent the pro-market and pro-business concepts. We limit the selection of variables to those that contain data for the earliest year, 1995. We select the variables Investor and Funding because these variables score highest on each of the orthogonal PCs presented in Figure 1. Thereby, the results of the PCA in section 2.1 are merely used as a reference frame to select the variables. Daling and Tamura (1970) find that the loadings of orthogonal factors can be used to select variables for regression analysis in order to minimize information overlap. The variables Investor and Funding have a correlation of 0.31. Investor and pro-market have a correlation of 0.78 and Funding and pro-business have a correlation of 0.79.

Table 6: Regression Results: Variable Selection

	(1) Growth	(2) Growth	(3) Growth	(4) Income	(5) Income	(6) Income
Investor	-0.119+	-0.128+		-0.045***	-0.050***	
	(0.10)	(0.08)		(0.00)	(0.00)	
Funding	0.294***		0.298***	0.065***		0.069***
	(0.00)		(0.00)	(0.00)		(0.00)
Investment	0.625***	0.667***	0.631***	0.054***	0.066***	0.057***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Openness	1.545***	1.623***	1.524***	0.387***	0.432***	0.392***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gconsumption	-0.841***	-0.889***	-0.807***	-0.103***	-0.120***	-0.093***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Education	0.447***	0.507***	0.471***	0.052***	0.068***	0.062***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP	-3.948***	-3.657***	-3.861***			
	(0.00)	(0.00)	(0.00)			
N	640	640	640	640	640	640
R^2	0.348	0.328	0.344	0.643	0.610	0.628

Standardized beta coefficients; p-values in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6 presents the estimation results when estimating using the variables Investor and Funding. Both variables are significant in all models. Investor has a negative relationship with both growth and income, and Funding has a positive relationship with both growth and income.[10]

4 Conclusion

The pro-market and pro-business distinction made by Rodrik and Subramanian (2005) is empirically traceable. The pro-market measurement constructed captures countries' degree of implementation of free-market policy, and the pro-business policy measurement summarizes countries' degree of implementation of policy that supports incumbent firms, in particular, in investment in technology and innovation. Overall, there is no strict opposition between pro-market and pro-business policy. Rather, countries' industrial policy path consists of a gradual implementation of more pro-business and pro-market policies. This suggests that pro-business policy does not hinder the development of a competitive free-market economy. We find that pro-business policy is an essential part of countries' overall industrial policy

[10]The coefficients of Investor and Funding have a low correlation; 0.03 for the growth model and 0.08 for the income model.

package and investing in pro-business policy has a positive effect on economic development.

Researchers not controlling for the effect of pro-business policy may underestimate the negative impact of pro-market policy on growth and income. Furthermore, researchers not controlling for the effect of pro-market policy may not find a significant result when testing the relationship between pro-business policy and economic development.

This study would benefit from further analysis comparing the perception-based policy data with qualitative data describing policy outcome. In addition, further analysis on the relationship between policy and institutions is needed in order to better understand countries' policy constraints.

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5 Appendix

Table 7: Country List

Code	Country
ARG	Argentina
AUS	Australia
AUT	Austria
BEL	Belgium
BGR	Bulgaria
BRA	Brazil
CAN	Canada
CHE	Switzerland
CHL	Chile
CHN	China
COL	Colombia
CZE	Czech Republic
DEU	Germany
DNK	Denmark
ESP	Spain
EST	Estonia
FIN	Finland
FRA	France
GBR	United Kingdom
GRC	Greece
HKG	Hong Kong
HRV	Croatia
HUN	Hungary
IDN	Indonesia
IND	India
IRL	Ireland
ISL	Iceland
ISR	Israel
ITA	Italy
JOR	Jordan
JPN	Japan
KAZ	Kazakhstan
KOR	Korea, South
LTU	Lithuania
LUX	Luxembourg
MEX	Mexico
MYS	Malaysia
NLD	Netherlands
NOR	Norway
NZL	New Zealand
PER	Peru
PHL	Philippines
POL	Poland
PRT	Portugal
QAT	Qatar
ROM	Romania
RUS	Russia
SGP	Singapore
SVK	Slovakia
SVN	Slovenia
SWE	Sweden
THA	Thailand
TUR	Turkey
TWN	Taiwan
UAE	United Arab Emirates
UKR	Ukraine
USA	United States
VEN	Venezuela
ZAF	South Africa

Table 8: WCY 1995-2011

Pro-Business Development Policy
Exchange: Exchange rates support the competitiveness of enterprises (1997-2011)
Research: Laws relating to scientific research do encourage innovation (2004-2011)
Regulation: Technological regulation supports business development and innovation (2005-2011)
Funding: Funding for technological development is readily available (1995-2011)
Ventures: Public and private sector ventures are supporting technological development (2007-2011)
Legal: Development and application of technology are supported by the legal environment (1997-2011)
Labour: Labour regulations (hiring/firing practices, minimum wages, etc.) do not hinder business activities (1995-2011)
Creation: Creation of firms is supported by legislation (2002-2011)
Ease: Ease of doing business is supported by regulations (2003-2011)
Framework: The legal and regulatory framework encourages the competitiveness of enterprises (1997-2011)
Tax: Real corporate taxes do not discourage entrepreneurial activity (1997-2011)
Environment: Environmental laws and compliance do not hinder the competitiveness of businesses (1995-2011)

Pro-Market Development Policy
Immigration: Immigration laws do not prevent your company from employing foreign labor (1995-2011)
Competition: Competition legislation is efficient in preventing unfair competition (1995-2011)
Ownership: State ownership of enterprises is not a threat to business activities (2007-2011)
Subsidies: Subsidies do not distort fair competition and economic development (2003-2011)
Incentive: Investment incentives are attractive to foreign investors (2007-2011)
Market: Capital markets (foreign and domestic) are easily accessible (2004-2011)
Investor: Foreign investors are free to acquire control in domestic companies (1995-2011)
Contract: Public sector contracts are sufficiently open to foreign bidders (1995-2011)
Protection: Protectionism does not impair the conduct of your business (1995-2011)
Customs: Customs' authorities do facilitate the efficient transit of goods (1997-2011)

Table 9: IPD 2009

Pro-Business Development Policy
A5033: Government support for private or public research & development (1-4)
B3022: Existence of targeted support measures for emerging growth sectors (0-4)
B5010: Existence of institutions or arrangements to support research and technological acquisitions for SMEs (0-4)
B5011: Existence of institutions or arrangements to support research and technological acquisitions for large firms (0-4)
B5012: Existence of institutions or arrangements to encourage technology transfers and skills transfers from foreign players to domestic players (0-4)
C5010: Government venture capital incentives (0-4)

Pro-Market Development Policy
B6031: Effectiveness of enforcement of international TRIPS arrangements for the protection of intellectual property (0-4)
B7020: Effectiveness of competition regulation arrangements (non-banking) to combat restrictive collective agreements i.e. cartels (0-4)
B7021: Effectiveness of competition regulation arrangements (non-banking) to combat abuses of dominant positions (0-4)
B8002: Restrictions on the issue of import licenses (1-4)
C6020: Publication requirement for firms issuing shares (0-4)
C7010: Existence of competition arrangements in the banking system to combat restrictive collective agreements i.e. cartels (0-4)
C7011: Existence of competition arrangements in the banking system to combat abuse of dominant position (0-4)
C8000: Openness of bank capital to foreign shareholding (0-4)
C8001: Right of establishment for foreign deposit banks and investment banks (0-4)

Table 10: Sources

Variable	Definition	Source	Scale
Pro-Market and pro-Business Policy	Policy indicators	IMD (2011)	Indicators are normalized on a scale of 0 to 1.
Pro-Market and pro-Business Policy	Policy indicators	IPD (2009)	Indicators are normalized on a scale of 0 to 1.
GDP	Real GDP per capita (Constant Prices: Chain series)	Heston, Summers, and Aten (2011)	
Growth	Growth rate of Real GDP per capita (Constant Prices: Chain series)	Heston, Summers, and Aten (2011)	Logarithmic change
Openness	Openness at 2005 constant prices	Heston, Summers, and Aten (2011)	% of GDP
Investment	Investment Share of PPP Converted GDP Per Capita at 2005 constant prices (Laspeyres series)	Heston, Summers, and Aten (2011)	% of GDP
Gconsumption	Government Consumption Share of PPP Converted GDP Per Capita at 2005 constant prices (Laspeyres series)	Heston, Summers, and Aten (2011)	% of GDP
Education	Secondary school enrollment	World Bank (2011)	% of gross enrollment ratio
Property	Property Rights	Heritage Foundation	From low property rights protection = 0 to high property rights protection = 1
Corruption	Freedom from corruption	Heritage Foundation	From lack of freedom from corruption = 0 to high freedom from corruption = 1

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